SYMONS'S

MONTHLY

# METEOROLOGICAL MAGAZINE.

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## THE BRITISH ASSOCIATION AT EXETER.

ALTHOUGH our expressed hope, that the meteorologists of Exeter would set an example to those "of other cities of the mode of preparing, discussing, and supporting meteorology at the British Association meetings in years to come," has not been fulfilled, we do not think we should be using too strong a phrase if we said that meteorology was very fairly represented in Exeter.

Following our practice in the preceding volume, we annex a list of those present who have more or less contributed to the progress of that branch of science to which these pages are devoted. It will be seen that the number is somewhat in excess of those present at Norwich.

Adams, Prof., F.R.S. .....Cambridge.
Amery, F. ..... .....Ashburton.
Atkinson, A. O. .....Hull.
Bateman, J. F., F.R.S, C.E. London.
Beardman, N., C.E. ..... ,,
Belcher, Admiral Sir E.... ,,
Birt, W. R., F.R.A.S. ... ,,
Brady, A..... ..... .. ,,
Brooke, C., F.R.S. ..... ,,
Curley, T..... .....Hereford.
Dymond, E. E. ... .....Wellington.
Ellacomb, Rev. H. T., Clyst St. George
Ellis, A. J., F.R.S.....London.
Ellis, W. H..... .. .....Exeter.
Field, R., C.E. .....London.
Fox, G..... .....Kingsbridge.
Gamlen, W. H. ..... .....Exeter.
Glaisher, J., F.R.S.....Blackheath.
Heberden, Rev. W. .....Honiton.
Horner, Rev. J. H. .....Frome.
Howlett, F., M.A., F.R.A.S. Beckenham.
Liddell, Capt., R.N. .....Bodmin.
Lowe, E. J., F.R.S. .....Nottingham.
Main, Rev. R., F.R.S. ...Oxford.
Mann, R. J., M.D. .....London.
Newton, Prof. H. A., Newhaven, U.S.
Osler, A. F., F.R.S. .....Birmingham
Parfitt, E.....Exeter.
Pengelly, W., F.R.S.... ..Torquay.
Phillips, Prof., F.R.S. ..Oxford.
Robinson, Rev. Dr., F.R.S. Armagh.
Rylands, T. G.....Warrington.
Shapter, T., M.D. .. .....Exeter.
Smelt, Rev. M. A. .....Cheltenham.
Smith, A. .....Scilly Isles.
Stark, J., M.D. .....Edinburgh.
Stewart, Balfour, F.R.S...Kew
Stokes, H. .....Tiverton.
Strange, Col, F.R.S. .....London.
Symons, G. J. . ..... ,,
Talmage, C. G. .....Leyton.
Tuckwell, Rev. W.....Taunton.
Vivian, E. .....Torquay.
White, Rev. H. Masters..Rotherham.
Whitley, N. .....Truro.
Woodward, C. J.....Birmingham.

The report of the Kew Committee, unlike all other reports, is not submitted to any of the Sections, but to the Council of the Association, and is by them passed on to the General Committee, hence it obtains priority of notice. We regret to find from it that the Kew Committee are yearly doing less for meteorology, their attention being devoted to magnetic and photoheliographic work, with a sole but important ex-

ception, viz., the verification of instruments. This action of the Kew Committee need cause neither surprise nor regret—it is in fact the natural result of the action of Government and the Royal Society in organizing the Meteorological Committee, and making Kew *their* central observatory.

## REPORT OF THE KEW COMMITTEE OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE FOR 1868-69.

THE Committee of the Kew Observatory submit to the Council of the British Association the following statement of their proceedings during the past year :—

The nature and amount of assistance to be rendered by this Committee to the Meteorological Committee of the Royal Society have now been clearly defined, and the duties undertaken at Kew Observatory may, as in the last Report, for clearness sake, be again considered under the two following heads :—

(A) The work done under the direction of the British Association.
(B) That done at Kew as the Central Observatory of the Meteorological Committee.

This system of division will be adopted in this Report, and it has been thought desirable, for the information of the Association, in the financial statement hereto appended, to include the sums received from the Meteorological Committee as well as those received from the British Association. It will thus be clearly seen that the work done at Kew for the Meteorological Committee has been paid for from funds supplied by that Committee, and not in any way from money subscribed by the British Association.

### (A) WORK DONE BY KEW OBSERVATORY UNDER THE DIRECTION OF THE BRITISH ASSOCIATION.

1. *Magnetic work.*—The Self-recording Magnetographs ordered by the Mauritius Government for Mr. Meldrum, after having been verified at Kew, have been forwarded to their destination.

A Unifilar and Dip-circle for Mr. Meldrum have likewise been verified.

A Unifilar and Dip-circle have been repaired and verified for the Rev. M. Colombel, who has gone to Nankin, where he intends making magnetical observations.

M. Colombel, as well as M. Berg, of the Wilna Observatory, have received magnetical instruction at Kew.

A Dip-circle is in the course of being verified for Lieut. Elagin, of the Russian Navy.

The usual monthly absolute determinations of the magnetic elements continue to be made by Mr. Whipple, magnetic Assistant. During the last year it has been found necessary to replace the wooden pillars of the magnetic house with pillars of Portland stone, which had been previously ascertained to be non-magnetic. It has also been found necessary slightly to repair the Unifilar and Dip-circle hitherto used in these monthly determinations.

The Self-recording Magnetographs are in constant operation as heretofore, also under the charge of Mr. Whipple, and the photographic department connected with these instruments remains under the charge of Mr. Page.

The task of tabulating and reducing the magnetic curves produced at Kew subsequent to January, 1865, is in progress under the direction of Mr. Stewart. Considerable advance has been made in these reductions during the present year, and it is hoped that during the next session of the Royal Society a paper may be communicated to that body by Mr. Stewart, giving certain results of these reductions as well as results of the absolute magnetic observations made every month.

Lieut. Elagin has communicated through Mr. Stewart to the Royal Society an account of observations made at the various European observatories, by means of a Dip-circle, which had been lent to him from the Kew Observatory.

Mr. Stewart has likewise communicated to the Royal Society a short paper by Senhor Capello, "On the reappearance of certain periods of Declination-disturbance during two, three, or several days;" also a joint paper by the Rev. W.

Sidgreaves and himself, embodying the results of a preliminary comparison of the Kew and Stonyhurst declination-curves; also a paper embodying the magnetical results obtained by Lieut. Rokeby at the island of Ascension, reduced by Mr. Whipple, magnetical assistant at Kew. Finally, Mr. Stewart has communicated to the Royal Society a paper containing a preliminary discussion of the peaks and hollows of the Kew magnetic curves for the first two years during which the Magnetographs were in operation.

2. *Meteorological work.*—The meteorological work of the Observatory continues in the charge of Mr. Baker.

Since the Norwich Meeting, 157 Barometers have been verified, and 27 have been rejected; 1153 thermometers have been verified, and 24 have been rejected. Two Standard Thermometers have been constructed for the Standards' Commission,* one for Stonyhurst College and one for Professor Tait. 38 Hydrometers have likewise been verified.

The progressive nature of this department of the Kew work will be seen by the following statement of the numbers of Barometers and Thermometers verified during the last few years :—

| | Barometers. | Thermometers. |
|---|---|---|
| 1863-4 | 97 | 389 |
| 1864-5 | 88 | 420 |
| 1865-6 | 126 | 395 |
| 1866-7 | 89 | 608 |
| 1867-8 | 78 | 1139 |
| 1868-9 | 157 | 1153 |

The self-recording meteorological instruments now at work at Kew will be again mentioned in the second division of this Report. These are in the charge of Mr. Baker, the photography being superintended by Mr. Page.

A Self-recording Barograph verified at Kew for Messrs. R. & J. Beck, has been disposed of by these opticians to Mr. Meldrum, of the Mauritius Observatory. A Barograph and Thermograph have been verified at Kew and dispatched to Mr. Ellery, at Melbourne, and a Barograph has recently been verified for Mr. Smalley, of Sydney.

At the request of Mr. G. J. Symons, the old Kew Thermometer frame has been lent to him for certain experiments, which are being carried on by him in conjunction with the Rev. C. H. Griffith, at Strathfield Turgiss.

The attention of meteorologists is directed towards an instrument devised by Mr. Beckley, mechanical assistant at Kew, for the purpose of registering the rainfall automatically. A description of this instrument will be submitted to the Association at Exeter.

Attention is likewise directed to a paper to be communicated by Mr. Balfour Stewart to the Association at the Exeter meeting, entitled "Remarks on Meteorological Reductions, with especial reference to the Element of Vapour;" separate copies of which will be at the disposal of members.

The following revised fees are charged for the verification of meteorological instruments at Kew :—

| | s. | d. |
|---|---|---|
| Barometers (requiring index and capacity-corrections) | 10 | 0 |
| Ditto (not requiring capacity-correction—inches measured) | 5 | 0 |
| Thermometers (ordinary) | 1 | 0 |
| Boiling-point Thermometers | 2 | 6 |
| Hydrometers | 1 | 0 |

3. *Photoheliograph.*—The Kew Heliograph, in charge of Mr. De La Rue, continues to be worked in a satisfactory manner. During the past year 274 negatives have been taken on 168 days: 40 pictures of the Pagoda in Kew Gardens, as a fixed terrestrial object at a known distance, have likewise been taken, with the object of determining, by measurements of these pictures, which

* While this Report is being printed, an application has been received from the Warden of the Standards, through Lieut.-Gen. Sir Edward Sabine, for an Air Thermometer.

are taken in different parts of the field of the telescope, both the optical distortion of the sun-pictures and the angular diameter of the Sun.

A paper communicated to the Royal Society by Messrs. Warren De La Rue, Stewart, and Loewy, entitled "Researches on Solar Physics.—Heliographical Positions and Areas of Sun-spots observed with the Kew Photoheliograph during the years 1862 and 1863," is the first of the series of reductions of the photographic solar records; it is in the course of publication in the 'Transactions,' and will shortly be distributed.

It is hoped that, during next winter, a paper containing the heliographical positions and areas of the spots observed at Kew during the years 1864, 1865, and 1866 may be communicated to the Royal Society, as well as a paper representing, both numerically and graphically, the spotted area of the sun during three complete solar periods, the results being partly derived from Schwabe's and partly from Carrington's observations, in addition to those made with the Kew photoheliograph.

Another paper by the above authors, entitled "Account of some Recent Observations on Sun-spots made at the Kew Observatory," has likewise been ordered to be published in the 'Philosophical Transactions.'

M. Berg, of the Wilna Observatory, has during the past year received instruction at Kew in the method of taking Solar Photographs and in that of measuring the positions and areas of sun-spots, the Director of the Observatory with which he is connected being desirous of working along with Kew, and of following out the same methods of observation as well as the same researches.

The number of sun spots recorded after the manner of Hofrath Schwabe, together with a table exhibiting the monthly groups observed at Dessau and at Kew for the year 1868, have been communicated to the Astronomical Society, and published in their monthly notices.

We regret to mention that Hofrath Schwabe, owing to his great age, has found it necessary to discontinue his observations; but the Committee have satisfaction in stating that arrangements have been made for continuing at Kew, the grouping of sun-observations which has been carried on for some time according to Hofrath Schwabe's plan, and for publishing the results annually.

A minute comparison of the records of Hofrath Schwabe with the simultaneous photographic records at Kew has revealed the great trustworthiness of his drawings, which are at present in the possession of Kew Observatory. The proposed communication already alluded to as representing the spotted area of the sun during three complete solar periods is thus rendered possible; and while it is imagined that by this means a valuable record of the past will be obtained, it is hoped that the interest now displayed in solar research will secure the uninterrupted continuance of such a record for the future.

4. *Miscellaneous work.*—The Superintendent has recently received a grant of £60 from the Government-Grant Committee of the Royal Society for the purpose of continuing certain experiments by Prof. Tait and himself on the rotation of a disc *in vacuo*; and means are in progress for obtaining a nearly perfect vaccum, Mr. Beckley, mechanical assistant at Kew, having devised an apparatus for this purpose.

An account of preliminary observations made with Kater's pendulum by the Superintendent, in conjunction with Mr. B. Loewy, has been communicated to the Royal Society.

The instrument devised by Mr. Broun for the purpose of estimating the magnetic dip by means of soft iron, constructed at the expense of the British Association, remains at present at the Observatory awaiting Mr. Broun's return to England.

The Observatory was honoured on June 25th by a visit from the eminent French chemist, M. Dumas, permanent Secretary of the Imperial Academy of Sciences, Paris, accompanied by M. Hervé-Mangon.

(B) WORK DONE AT KEW AS THE CENTRAL OBSERVATORY OF THE METEOROLOGICAL COMMITTEE.

The relation between the two Committees, the Kew and the Meteorological, has during the last year been definitely settled.

The Kew Committee have undertaken to maintain the self-recording instruments belonging to the Meteorological Committee in regular operation at Kew, to tabulate from the traces, and to forward the traces and tabulations once a month to the central office of the Meteorological Committee in London, where they will be finally reduced, under the supervision of the Director of that office. They have also sanctioned the employment of such assistance by Mr. Stewart as may be necessary to enable him to examine the records which arrive from the various outlying observatories of the Meteorological Committee, in accordance with a plan which has been approved by that body. Once a week, therefore, documents from these various observatories arrive at Kew, and about the middle of each month the documents for all the observatories (including Kew) for the previous month, after having been well examined, are forwarded to the Meteorological Office with a few remarks, which are printed in the Minutes of the Meteorological Committee.

Besides these duties which they have undertaken, the Kew Committee are glad to render the Meteorological Committee any occassional assistance which it may be in their power to bestow.

1. *Work done at Kew as one of the Observatories of the Meteorological Committee.* This consists in keeping in constant operation the Barograph, Thermograph, and Anemograph furnished by the Meteorological Committee. Mr. Baker is in charge of these instruments. From the first two of these instruments traces in duplicate are obtained, one set being sent to the Meteorological Office and one retained at Kew; as regards the Anemograph, the original records are sent, while a copy by hand of these on tracing-paper is retained. The tabulations from the curves of the Kew instruments are made by Messrs. Baker, Page, and Foster.

2. *Verification of Records.*—In order to maintain uniformity in the system of observation at the various meteorological observatories, it is arranged by the Meteorological Committee that Mr. Stewart shall personally visit all the observatories once every year, in addition to which, when necessary, some one of the Kew assistants will occasionally visit particular stations with a specific object in view. At the request of the Meteorological Committee, a system of checks has been devised by the Kew Committee for testing the accuracy of the observations made at the different Observatories. This system with slight modifications, is now in operation. As this revision takes place at Kew, it has been found necessary to engage an additional assistant for the purpose of undertaking it. Mr. Rigby has been engaged for this duty—Mr. Baker, Meteorological Assistant, having the general superintendence of this department.

3. *Occasional Assistance.*—In addition to devising the system of checks mentioned above, the Kew Committee have also, at the request of the Meteorological Committee, examined the subject of instrumental verifications, and it has been found that, owing to improved construction, a higher standard of excellence in meteorological instruments may be insisted upon without rejecting more than a very small per-centage of those furnished by good makers.

It has therefore been resolved by the Meteorological Committee that in future the following limits of error shall be allowed in the construction of their instruments.

*Marine Barometers of the pattern adopted by the Meteorological Office.*—Reject all for which the index-error at the ordinary pressure is greater than ·015 inch, or the capacity-error greater than ·004 inch, or for which the mercury does not fall from 1½ inch to ½ inch above the present pressure in a time between 3 and 6 minutes. But for *barometers purporting to be standards,* reject all for which the index error at the ordinary pressure is greater than ·010 inch.

*Thermometers (graduated on the stem) of the pattern adopted by the Meteorological Office.*—Reject all in which the largest error at any point is greater than 0°·3, or in which any space of 10° is more than 0°·3 wrong.

*Hydrometers of the pattern adopted by the Meteorological Office.*—Reject all in which the largest error at any point is greater than 1 division of the scale (equal to ·001 sp. gr.), or in which any space of 10 divisions is more than 0·6 division wrong.

Models of Pantagraphic Apparatus, designed by Mr. Galton, have been made and experimentally used at Kew, at the desire of the Meteorological Committee,

to reduce the tracings of the self-registering instruments in any desired proportions, either in length or in breadth, with a view to the ultimate publication by that Committee of all the tracings supplied by the seven Observatories in a compact volume.

It may also be mentioned, under the head of Occasional Assistance, that at the request of the Meteorological Committee, Mr. Beckley, mechanical assistant, was sent to Armagh to examine the Barograph there, and to Sandwick Manse, Orkney, to superintend the erection of an anemometer. The expenses have, on both these occasions, been repaid by the Meteorological Committee.

In conclusion, the Kew Committee desire to bring under the notice of the British Association, that the system of automatic records established and in actual work at the Kew Observatory, comprehends magnetic, barometric, and thermometric observations, as well as those of the direction and velocity of the wind, to which an electric self-recording instrument will soon be added. They think that it would be very advantageous to magnetical and meteorological science if a fully illustrated work were published descriptive of these instruments, and of the method of working them, together with the method of reductions actually employed.

J. P. GASSIOT, *Chairman.*

*Kew Observatory, 15th July*, 1869.

## UNDERGROUND TEMPERATURE.

Mr. G. J. Symons was called upon to read the "Report of the Committee on Underground Temperatures." He stated that he was only one of the members of the committee, but the duty of reading the report fell on him in consequence of the absence of the chairman, Professor Sir William Thomson, and of the secretary, Professor Everett, of Belfast. The report set forth that the committee had tried experiments on underground temperatures at Glasgow, Dundee, and wherever they could get access to very deep wells or borings in the earth. But the chief experiments had been tried in a well made many years ago at Kentish Town by a company formed for the purpose of supplying the district with water. The total depth in this instance was 1,302 feet, 540 feet of which consisted of a bricked well, and the remainder of a boring lined with thin sheet iron. The well was made first, but as the people in the neighbourhood complained of the hardness of the water, the boring was done, the result being that the supply of water fell off, and the company ruined itself after spending £100,000 on the works. The committee had obtained the use of the old well, and fitted up winding apparatus in a hut above it, to let specially-constructed thermometers up and down in the boring. The general result of the experiments hitherto made was to prove an increase of temperature of one degree for every 52·4 feet increase in depth.

Mr. S. J. Mackie, F.G.S., said that he thought the theory of the internal fluidity of the globe to be untenable. Yet if the increase in temperature mentioned by Mr. Symons continued the same at all depths, at about 450 miles below the surface of the earth, the temperature must be equal to that of the surface of the sun. From diagrams on the wall he noticed that the increase of temperature only became regular after the bricked portion of the well was passed and the boring reached. He thought that perhaps the conduction of the iron tube would tend to equalize the temperature, and that if the sides of the

boring had been rock, irregularities in temperature would have been recorded.

Mr. Symons said that the iron tube was thin—only about one-tenth of an inch in thickness, and 8 inches in diameter. It would be a good plan to sink a short length of such a tube in the ground, and to find out whether its conduction of heat influenced the results.

*(To be continued.)*

## SUDDEN FALL OF TEMPERATURE.

THE very rapid change which occurred towards the end of August ought not to pass without notice; we therefore insert with pleasure a few of the statements we have received. Our readers will find many others in our usual monthly table.

*To the Editor of the Meteorological Magazine.*

SIR,—We have had a great wave of heat in these parts, followed by a wave of cold.

| | max. | | min. | | max. | | min. |
|---|---|---|---|---|---|---|---|
| August 23... | 72·5 | ..... | 53·0 | August 28 ... | 86·5 | ..... | 64·5 |
| ,, 24 .. | 70·5 | ..... | 50·0 | ,, 29 ... | 70·0 | ..... | 63·0 |
| ,, 25... | 80·0 | ..... | 52·5 | ,, 30 ... | 65·0 | ..... | 55·0 |
| ,, 26... | 85·0 | ..... | 58·0 | ,, 31 ... | — | ..... | 43·0 |
| ,, 27... | 87·0 | ..... | 64·0 | | | | |

On Sunday, 29th, we had a change of wind from nearly due East to N.W., thence to N., N.E., and E. In less than 24 hours, the wind, which had been coming from the E. as over a heated sand plain, came in from the same quarter as if over an ice field. Our highest temperature in 1868 was only 85°.—Yours, &c.,

I. H. GOSSET.

*Northam Vicarage, Bideford, N. Devon, August 31st, 1869.*

*To the Editor of the Meteorological Magazine.*

SIR,—The following is the amount of rainfall which fell at Sellack, near Ross, Herefordshire, in August, 1869:—August 1st, ·09; 3rd, ·30; 4th, ·11; 8th, ·43; 13th, ·07; therefore, an appreciable amount fell on only 5 days, and the total fall amounted to 1·00 inch.

A "period of drought" may be said to have commenced on the 9th, (the very day, by the way, on which, or about which, a dry period should have set in according to Mr. Brumham's prediction in the *Meteorological Magazine* of May last), and since the 13th not a drop of rain has fallen in this neighbourhood.

The past month has been characterized by the absence of thunder and lightning. It is singular that in the month of December last we should have had, at this locality, six days of thunder and lightning, while in the whole three summer months of June, July, and August of the present year I have only noticed thunder on three days, and then extremely distant.

A very remarkable fluctuation of temperature took place on the 28th and 29th. On the 27th (the hottest day of the summer here), my thermometer at 4 ft. rose to 88° in the shade, and on the 28th to

86°·5, only falling to 66° at night. On the morning of the 29th, at 5 a.m., a dense cloud-bank arose in the east, with a fresh E.N.E. breeze, and the thermometer went down, by noon on that day, to 57°, and yesterday morning to 44°·5—a most extraordinary fall in so short a space of time, especially as being unaccompanied (here) by any fall of rain or storm of any description. A fall of the barometer of ·23 in. immediately preceded the change.

Here, as elsewhere, we have been visited by a remarkable swarm of lady-birds; wasps, of which I noticed singularly few in the earlier months, are now unusually numerous.

W. CLEMENT LEY.

*Sellack, Hereford.*

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*To the Editor of the Times.*

SIR, —On Saturday last the highest shade temperature was exactly 90°; lowest, 53°.

Last night the mercury sank to the freezing point (32°), having during the day risen not higher than 57°.

My instruments hang on a Glaisher stand, and are, I believe, perfectly accurate.—I have the honour to remain, Sir, your obedient servant,

J. BORLASE TIBBITS.

*Barton Seagrave, Kettering, Aug.* 31.

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*To the Editor of the Times.*

SIR,—The weather here has been unusually hot, and yesterday (Saturday), the 28th, the thermometer reached 94°·6 in the shade, and 110°·2 in sunshine. On the 27th the temperature was 93°·7 in the shade, and 119°·1 in the sun.

Yesterday the temperature at 8.30 p.m. was as high as 75°·7, and at 11 p.m. 70°. Wind, S.S.E.; sky cloudless.

To-day there has been a great diminution of heat. At 12.30 a.m. temperature 64°·3, at 7 a.m. 55°·8, 9 a.m. 58°·0, noon 60°·2, 11 p.m. 52°·1, greatest heat 60°·8, which is 33°·8 lower than that of yesterday. Sky overcast, and the wind N.E. and brisk.

No rain has fallen since the 13th inst.—I have the honour to be, Sir, your obedient servant,

E. J. LOWE.

*Highfield House Observatory, August* 29.

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*To the Editor of the Meteorological Magazine.*

SIR,—The weather since I have been here has been so extraordinary, that I send a note of it.

| | Max. | Min. | Range. | Max. in Sun. |
|---|---|---|---|---|
| Aug. 24th | 78·5 | — | — | 133·0 |
| ,, 25th | 86·0 | 49·5 | 36·5 | 130·0 |
| ,, 26th | 91·1 | 45·8 | 45·3 | 130·0 |
| ,, 27th | 85·8 | 53·0 | 32·8 | 121·0 |
| ,, 28th | 88·2 | 53·7 | 34·5 | 123·2 |
| ,, 29th | 52·0 | 50·0 | 2·0 | 59·5 |
| ,, 30th | ... | ... | ... | ... |
| ,, 31st | 69·0 | 32·3 | 36·7 | 114·8 |

On the 28th, at 3 p.m., 88°; on the 29th, at 3 p.m., 48°; fall in one day, 40°. The heat on the 26th (91°·1) was 1°·1 higher than the

maximum for last year; the min. on the 31st (32°·3) was lower than I have ever recorded it in August.—Yours, &c.,

F. W. STOW.

*Ripon, August*, 1869.

*To the Editor of the Meteorological Magazine.*

SIR,—I send you five days temperatures, as they are rather extraordinary.

| DATE. | Max. 4ft. in shade. | Min. on grass. | Black Bulb on Grass. | B. Bulb *in vacuo*, 4 ft. | REMARKS. |
|---|---|---|---|---|---|
| August 27 ... | 82 | 50 | 88 | 116 | 80° in shade at 5.30 p.m. |
| ,, 28 ... | 89 | 51 | 104 | 134 | 77° in shade at 9 a.m. |
| ,, 29 ... | 69 | 51 | 62 | 69 | |
| ,, 30 ... | 59 | 38 | 70 | 105 | |
| ,, 31 .. | 64·5 | 30 | 74·5 | 98 | White frost. |

Taken at 9 p.m., except min. on grass. Thermometers verified at Kew, but corrections not applied. Max. temp. entered against 29th, occurred at 9 p.m. on 28th.

H. B. C.

*Fartown, Huddersfield, August* 31, 1869.

*To the Editor of the Meteorological Magazine.*

SIR, —On the four days mentioned below, my thermometer in shade stood as follows, at 2 p.m. :—

August 26th, 87° August 28th, 84°
,, 27th, 88° ,, 29th, 52°

Yours respectfully,
P. P. PENNANT.

*Brynbella, St. Asaph, Sept. 3rd*, 1869.

*To the Editor of the Meteorological Magazine.*

SIR,—On the 28th of last month the thermometer (not verified) reached a greater height than I ever before knew, 85°. At 2 p.m. a slight E. wind came on, and quickly cooled the air considerably; but it continued very hot till 7 p.m., when a brisk N.W. breeze sprang up, and about 8 p.m. it changed to N., and grew stronger, making it quite cool. The max. on the 29th was only 55°.—Yours truly,

T. W. BACKHOUSE.

*West Hendon House, Sunderland, Sept. 2nd*, 1869.

*To the Editor of the Meteorological Magazine.*

SIR,—On the 28th of August last the thermometer stood at 86°·5 in the shade, and on the 29th the maximum was only 52°.

SAMUEL MORRIS.

*Norwood Cottage, Casterton, Kirkby Lonsdale.*

## HEAVY FALL OF RAIN AT GELDESTON, JULY 18TH.

*To the Editor of the Meteorological Magazine.*

SIR,—There was a very unusual fall of rain here yesterday (Sunday, July 18th); it began a little after 4.30 p.m., and was quite over at

6.15 p.m. There was 1·64 inches in the gauge at 6.30, none of which had fallen before 4.30. It was accompanied by almost incessant thunder and very vivid lightning. Two trees were struck about three-quarters of a mile from here, and at Beccles damage was done to houses and trees. The roads are very much cut up, and several cottages were partially flooded with the quantity of mud and water which rushed into them off the roads, and which, in one instance at least, penetrated into every room on the ground floor, and was deep enough to set small articles afloat. There was not much hail here, but at Beccles some large pieces of ice fell, two of which were immediately taken into a shop and weighed, when each was found to be three-quarters of an ounce in weight. The storm was so violent that no one seems to recollect one equal to it hanging over this parish. The barometer fell very gradually from 30·37 (corrected) at which it stood at 9 a.m. on Thursday, 15th, to 30·12 on Sunday, at 9 p m.; since then it has risen again to 30·18 this morning, Monday, at 9 a.m.

Yours, &c., M. DOWSON.

*Geldeston, Beccles, July* 19, 1869.

## A HAIL STORM.

*To the Editor of the Meteorological Magazine.*

SIR,—I send you a slip from the *Queensland Times*, perhaps some of your correspondents can match, or even cap, this tale.

Yours &c., R. D. BLACKMORE.

"As an instance of the extraordinary size of the hailstones which fell during the storm of Thursday week past, we may mention that a carrier named Hutton, who was coming into town with his team, had one of his horses struck in the forehead with a hailstone, which felled him to the ground as if struck by a bullet. His owner was compelled to leave him lying insensible while he got the remainder of his team safe to town. On the following day the horse was hunted up by Hutton, when it was found that his skull was broken, and he died on the third day after. This is the only instance we have ever heard of where hailstones fell of sufficient weight to break a horse's skull. Fortunately the stones did not fall very thickly, or nothing could have stood before them. The full weight of the storm was felt west and south of the town, and much damage was done by it. Many farmers have had their corn and other growing crops completely ruined, and at Lyndhurst three acres of grapes were almost destroyed. Incredible as it may seem, we have been assured by many who reside in the directions mentioned that the hailstones fell the size of ordinary pine-apples, some of them measuring from nine to eleven inches in circumference."—*Queensland Times, Feb. 4th*, 1869.

## TYNESIDE RAINFALL.

As we expected, the differences between the values printed in *British Rainfall* and in the *Tyneside Report* prove mainly due to indistinct writing, and neglect of decimal points. The following

tabular statement has been drawn up, after reference to the observers concerned, one of whom, however, has not replied to our enquiries. The following are all the cases of differences previously unexplained:—

| Station. | Date. | Tyneside Report. | British Rainfall. | Correct Amount. |
|---|---|---|---|---|
| Sedgefield..... | 1868, November | 2·21 | 2·11 | 2·11 |
| Seaham Hall. | ,, February. | 0·73 | 0·63 | 0·63 |
| Otterburn.. | ,, August.... | 3·00 | 2·00 | 3·00 |
| ,, | ,, December. | 5·51 | 5·10 | 5·10 |
| Greta Bridge. | ,, January.. | 3·22 | 3·21 | ... |
| ,, ,, | ,, April . ... | 3·29 | 3·19 | ... |
| ,, ,, | ,, May..... | 1·10 | 1·01 | ... |

Consequently, the values for Sedgefield and Seaham Hall are correctly given in *British Rainfall*, but Otterburn should be 33·64 instead of 32·64. We hope the trouble these errors give to all parties will induce observers to be very careful in keeping their books clearly and distinctly written if they desire able and industrious men, like Mr. Wheeler, to devote time to tabulating and publishing their observations. It is quite enough that he should have the trouble of working up the returns, it is too much that, through illegibility, his work should be doubled and its value impaired.

## DROUGHT IN THE WEST OF SCOTLAND.

The past summer has been an unusually dry one in the West of Scotland, and in consequence several of the towns on the estuary of the Clyde are beginning to suffer from want of sufficient water. In Greenock—where the rainfall from the 1st of March to the present date has been less than 13in., or about half the usual quantity—the supply has been reduced to about 34 days for domestic purposes, and it has been resolved, at very considerable inconvenience to trade, to discontinue the supply to the chief public works, and to limit the quantity given to private consumers. At Dumbarton and other places a similar scarcity prevails. As yet there is no prospect of rain in the district.—*The Times.*

## A FIERY WIND.

Out in Cheatham county about noon on Wednesday—a remarkably hot day—on the farm of Ed. Sharp, five miles from Ashland, a sort of whirlwind came along over the neighbouring woods, taking up small branches and leaves of trees and burning them in a sort of flaming cylinder that travelled at the rate of about five miles an hour, developing size as it travelled. It passed directly over the spot where a team of horses were feeding and singed their manes and tails up to the roots; it then swept towards the house, taking a stack of hay in its course. It seemed to increase in heat as it went, and by the time it reached the house it immediately fired the shingles from end to end of the building, so that in ten minutes the whole dwelling was wrapped in flames. The tall column of travelling caloric then continued its course

over a wheat field that had been recently cradled, setting fire to all the stacks that happened to be in its course. Passing from the field, its path lay over a stretch of woods which reached the river. The green leaves on the trees were crisped to a cinder for a breadth of 20 yards, in a straight line to the Cumberland. When the "pillar of fire" reached the water, it suddenly changed its route down the river, raising a column of steam which went up to the clouds for about half-a-mile, when it finally died out. Not less than 200 people witnessed this strangest of strange phenomena, and all of them tell substantially the same story about it. The farmer, Sharp, was left houseless by the devouring element, and his two horses were so affected that no good is expected to be got out of them in future. Several withered trees in the woods through which it passed were set on fire, and continue burning still.--*Nashville (Tennessee) Press.*

## A TOWN DESTROYED BY A HURRICANE.

The *St. Lawrence Journal* gives the following account of a terrible hurricane which happened recently in that neighbourhood:—Messrs. Thomas Thompson and S. N. Beman, who reached this city on July 28th from the West, inform us that they stopped at Detroit, a small town about six miles east of Abiline, on the Kansas Pacific road, and about nine o'clock the storm burst upon that devoted village in all its fury. The thunder and lightning were terrific, and the wind swept past, a perfect hurricane. The station is known on the railroad map as Lamb's Point, but a town had just started up which was named Detroit. Every house in the village, with one exception, was entirely destroyed. Furniture, bed, and bedding were scattered over the prairie and lost and destroyed. Fortunately no one received serious injury, within the knowledge of our informants, although a number were slightly injured. People were compelled to stand out on the prairie after the buildings were blown away, and endure the terrors of the hurricane and the pitiless pelting of the rain and hail. Only two families had secured anything like a shelter from the storm, and one of these did so by taking refuge in a cellar after the building had been demolished, and by this means secured a partial shelter from the fury of the elements. Those in the tents fared better than those in houses. Although the tents blew down, yet they fell upon the occupants, and thus saved them from a severe pelting. In many cases the corn has been completely riddled by the hail, and wheat that had been harvested and shocked in the field was scattered in every direction. Telegraph poles were blown down, the wires lying on the ground. The hurricane struck the fated village from the north-west, and the work of destruction was quick and terrible. It is, indeed, a miracle that no lives were lost, or more serious results followed such a storm; and, as it is, we may yet hear of the loss of life from other places near by.—*York Herald.*

*August 28th*, 1869.

# AUGUST, 1869.

| Div. | | STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.] | RAINFALL. Total Fall. | Difference from average 1860–5 | Greatest Fall in 24 hours. Dpth | Date | Days on which ·01 or more fell. | TEMPERATURE. Max. Deg. | Date. | Min. Deg. | Date | No. of nights below 32° on grass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | inches | inches. | in. | | | | | | | |
| I. | ENGLAND. | Camden Town | 1·26 | — ·38 | ·28 | 3 | 8 | 89·0 | 28 | 42·0 | 31 | 0 |
| II. | | Staplehurst (Linton Park) | 1·16 | — 1·55 | ·34 | 3 | 10 | 88·0 | 28 | 45·0 | 31 | 0 |
| ,, | | Selborne (The Wakes) | 1·49 | — 1·69 | ·35 | 3 | 9 | 83·0 | 26* | 34·4 | 31 | 1 |
| III. | | Hitchen | ·87 | — 1·48 | ·43 | 3 | 8 | 80·0 | 27+ | 38·0 | 30§ | 0 |
| ,, | | Banbury | ·91 | — 1·22 | ·33 | 7 | 11 | 85·0 | 27 | 33·0 | 31 | 0 |
| IV. | | Bury St. Edmunds (Culford) | 2·25 | — ·19 | ·60 | 7 | 15 | 83·0 | 28 | 32·0 | 3 | 2 |
| V. | | Bridport | ·25 | — 2·19 | ·12 | 12 | 3 | 86·0 | 27 | 40·0 | 12 | 0 |
| ,, | | Barnstaple | 1·43 | — 2·76 | ·53 | 13 | 10 | 89·0 | 27‡ | 51·0 | 30 | ... |
| ,, | | Bodmin | ·78 | — 3·08 | ·22 | 12 | 10 | 84·0 | 26 | 42·0 | 31 | 0 |
| VI. | | Cirencester | 1·51 | — 1·33 | ·85 | 4 | 4 | ... | ... | ... | ... | ... |
| ,, | | Shifnall (Haughton Hall) | 1·41 | — 1·46 | ·36 | 7 | 10 | 79·0 | 27+ | 37·0 | 31 | 1 |
| ,, | | Tenbury (Orleton) | 1·20 | — 1·68 | ·36 | 7 | 7 | 89·5 | 28 | 31·2 | 31 | 1 |
| VII. | | Leicester (Wigston) | 1·21 | — ·98 | ·30 | 7 | 10 | 95·0 | 28 | 31·0 | 30 | 1 |
| ,, | | Boston | 1·57 | — ·72 | ·68 | 7 | 10 | 85·8 | 27 | 39·0 | 31 | 0 |
| ,, | | Grimsby (Killingholme) | 2·32 | .. | ·62 | 9 | 11 | 81·0 | 28 | 40·0 | 31 | 1 |
| ,, | | Derby | ·99 | — 1·61 | ·25 | 7, 12 | 11 | 86·0 | 28 | 36·0 | 31 | 1 |
| VIII. | | Manchester | 2·63 | — ·87 | ·81 | 7 | 10 | ... | ... | ... | ... | 0 |
| IX. | | York | 1·66 | — 1·05 | ·52 | 7 | 14 | 85·0 | 28 | 37·0 | 31 | 0 |
| ,, | | Skipton (Arncliffe) | 2·48 | — 3·46 | ·67 | 7 | 10 | 91·0 | 29 | 30·0 | 31 | 1 |
| X. | | North Shields | 1·29 | — 1·56 | ·32 | 2 | 9 | 81·0 | 28 | 40·3 | 31 | 0 |
| ,, | | Borrowdale (Seathwaite) | 4·51 | — 9·57 | 1·59 | 8 | 16 | ... | ... | ... | ... | ... |
| XI. | WALES. | Cardiff (Town Hall) | 1·38 | ... | ·43 | 12 | 8 | ... | ... | ... | ... | .. |
| ,, | | Haverfordwest | 2·20 | — 2·68 | 1·00 | 12 | 6 | 84·5 | 26 | 37·0 | 30 | ... |
| ,, | | Rhayader (Cefnfaes) | 1·49 | — 3·17 | ·52 | 1 | 7 | 86·0 | ... | 33·0 | ... | ... |
| ,, | | Llandudno | 1·66 | — 4·28 | ·95 | 7 | 9 | 85·2 | 27 | 44·0 | 31 | ... |
| XII. | SCOTLAND. | Dumfries | ·86 | — 3·02 | ·32 | 3 | 8 | 84·5 | 27 | 36·0 | 30 | 1 |
| ,, | | Hawick (Silverbut Hall) | 1·01 | ... | ·34 | 3 | 9 | ... | ... | ... | ... | 2 |
| XIV. | | Ayr (Auchendrane House) | 1·47 | — 2·49 | ·41 | 7 | 10 | 74·0 | 25* | 28·0 | 30 | 1 |
| XV. | | Castle Toward | 1·18 | — 5·12 | ·45 | 2 | 6 | 79·0 | 28 | 29·0 | 30 | 2 |
| XVI. | | Leven (Nookton) | ·86 | — 2·13 | ·27 | 13 | 11 | 83·0 | 28 | 33·0 | 30 | 0 |
| ,, | | Stirling (Deanston) | ·76 | — 3·87 | ·18 | 1, 12 | 8 | 79·8 | 28 | 25·7 | 30 | 2 |
| ,, | | Logierait | ·88 | ... | ·25 | 1 | 9 | ... | ... | ... | ... | .. |
| XVII. | | Ballater | 1·68 | ... | ·51 | 1 | 11 | 80·0 | 25 | 29·5 | 30 | 1 |
| ,, | | Aberdeen | 1·33 | ... | ·57 | 7 | 10 | 81·5 | 25 | 36·9 | 30 | 1 |
| XVIII. | | Inverness (Culloden) | 1·49 | ... | ·35 | 2 | 13 | 69·4 | 25 | 41·6 | 30 | 0 |
| ,, | | Fort William | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| ,, | | Portree | 4·01 | — 3·44 | ·87 | 6 | 18 | ... | ... | ... | .. | ... |
| ,, | | Loch Broom | 1·74 | ... | ·91 | 9 | 16 | ... | ... | ... | ... | ... |
| XIX. | | Helmsdale | 1·84 | ... | ·65 | 7 | 16 | ... | ... | ... | ... | ... |
| ,, | | Sandwick | 2·37 | — 1·34 | ·50 | 6 | 23 | 64·1 | 25 | 42·8 | 13 | ... |
| XX. | IRELAND. | Cork | ·87 | ... | ·42 | 12 | 7 | ... | ... | ... | ... | ... |
| ,, | | Waterford | 1·22 | — 2·73 | ·80 | 12 | 5 | 81·0 | 27 | 46·0 | 31 | ... |
| ,, | | Killaloe | 1·02 | — 3·91 | ·30 | 12 | 12 | 86·0 | 28 | 39·0 | 12§ | 0 |
| XXI. | | Portarlington | 1·23 | — 3·27 | ·26 | 30 | 12 | 83·5 | 28 | 37·0 | 30 | ... |
| ,, | | Monkstown | 1·23 | — 1·98 | ·22 | 13 | 10 | ... | ... | ... | ... | ... |
| XXII. | | Galway | 1·47 | ... | ·26 | 2 | 11 | 84·0 | 28 | 38·0 | 30 | ... |
| ,, | | Bunninadden (Doo Castle) | 1·34 | ... | ·54 | 2 | 13 | 81·0 | 28 | 29·0 | 31 | 2 |
| XXIII. | | Bawnboy (Owendoon) | 1·24 | ... | ·41 | 3 | 9 | 92·0 | 28 | 41·0 | 19‖ | 0 |
| ,, | | Waringstown | 1·88 | ... | ·36 | 1 | 8 | 83·0 | 26 | 31·0 | 29 | 1 |
| ,, | | Strabane (Leckpatrick) | 1·68 | .. | ·36 | 1 | 13 | 78·0 | 27 | 29·0 | 30 | 1 |

* And 27th. + And 28th. ‡ And 28th & 29th. § And 31st. ‖ And 30th.
+ Shows that the fall was above the average; —that it was below it.

## METEOROLOGICAL NOTES ON THE MONTH.

ABBREVIATIONS.—Bar for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

### ENGLAND.

LINTON PARK.—First fourteen days showery, but no heavy R, the remainder quite dry; very hot from the 20th to the 28th; distant T on night of 5th, and L on night of 11th; bar. high and steady the latter part of the month, the winds N.E. and E. during that time. On the whole, a dry favourable month for the harvest, which, however, is late; the last two days much cooler.

SELBORNE.—The weather during the month extremely favourable for the harvest, which has been got in in excellent order. Faint T heard at 4 p.m. on 1st, 5 p.m. on 3rd, and on the 14th; bar. 29·84 without the slightest variation during the five days, 19th to 23rd; average max. temp., five days, 24th to 28th, 81°; dense fog on 28th; frost on the ground on the 31st; wheat harvest began in some places on the 6th, harvest general on the 9th.

CULFORD.—T on 5th; very hot from the 25th to the 29th, when a sudden change took place, max. temp. being, on 28th, 83°, and on the 29th only 61°; on the 3rd the temp. fell to 32°, and on the 30th to 33°, and on each occasion ice was found on the grass, &c.

BRIDPORT.—Harvest entirely completed in the neighbourhood with a fair average crop; a good deal of sea fog early in the month, otherwise very fine, and cloudless sky on several days.

BODMIN.—The drought is most severely felt, and the streams are not more than one-third the size of a summer average.

CIRENCESTER.—The rains saved the turnips from destruction, but the intense dryness and great heat of the last week must have suspended their growth as it has that of grass; temp. 84° on 28th, on 29th about 60°, and on 31st ice on the grass.

SHIFFNAL.—The month began with genial showers, which lasted almost daily to the 14th, when the dry weather again set in and continued through the month. The harvest was well secured, the R being sufficient to refresh the grass and turnips without in the least injuring the grain; about the 20th vast numbers of lady-birds appeared, which did great service by clearing off the aphides which greatly infested vegetation, and also the American blight on the apple trees; they were the seven-spot species chiefly, but all *yellow*, with few exceptions, instead of bright red as they were in the early year. The heat of the 27th and 28th most oppressive; a sudden change on the 29th with a strong N.E. wind; slight ice on the morning of the 31st, when the potatoes were cut down, though the ther. was not near freezing point; a difference of 20° between the max. temp. of the 28th and 30th.

ORLETON.—A fine harvest month; cool till the 21st, when it became very hot and brilliant with four days of cloudless sky; on the 28th, ther. in shade 89°·5; on 29th, cloudy sky, with cold N.E. wind and a fall in max. temp. of nearly 29°; on the morning of the 31st a severe frost on grass 28°·2, which cut down the tender plants and flowers and the potatoe tops; pastures very brown for want of R; T heard on 1st at 4.30 p.m., but no L seen.

WIGSTON.—An unusually dry month; the mean of the max. of the seven days ending on the 28th was 87°·3, the max. on 28th was 95°, that on the 29th, 60°; French beans, potatoes, dahlias, &c., were cut off by the frost of the 29th.

GRIMSBY.—High bar.; very refreshing rains in the former half of the month, which helped to fill the ears of corn and revive the pastures; the latter half dry, splendid harvest weather; hot from the 23rd to 28th, on the last named day the temp. was 81° in the shade; a great change followed, the max. temp. of the 29th being 58° and the 30th the same; rooks wheeling aloft, and "playing at foot-ball" on the 28th, seemed to fortell the atmospheric change that was impending. Rime on the morning of the 31st; distant T on the 1st; TS on 4th at 4 p.m., when a foal was killed, another TS at 6.30 p.m. on 10th; high tide in the Humber on 10th; first wheat cut in this parish on the 13th, the general harvest began on the 16th; much gossamer on 20th, 27th, and 28th. Distant L on 5th.

DERBY.—The paucity of R and high temp. of a portion of the month have

favourably influenced the harvest operations, which in this neighbourhood are nearly finished; the pastures present a dreary aspect, and gardens are parched up; the temp. of the month was 1½° above the mean, but it was 1° below August, 1868; on the 28th it rose to 86°, and the highest point reached on the 29th was 59°. A severe ground frost on the night of the 30th, doing some damage.

ARNCLIFFE.—Unusually dry after the 7th.

NORTH SHIELDS.—Rainbow on night of the 1st; T on the 2nd.

## WALES.

HAVERFORDWEST.—The month commenced cool, with northerly air, and wet up to the 12th; after which the weather was fine, continuing cool with N.E, wind till the 22nd; up to that date the ther. did not once reach 70° in the shade; from that time the heat daily increased, until it reached a higher point than on any day either in this or last summer. Very splendid harvest weather, remarkably clear sky, with some very cold nights and heavy dews; water remarkably low everywhere.

CEFNFAES.—Generally hot and dry; prevailing wind N.W.; grain harvest good; average crops of barley and wheat, oats indifferent and very short in straw; a premature autumn, trees and hedges losing their foliage; want of water severely felt.

LLANDUDNO.—Commenced cutting barley and peas on the 1st, wheat cut on the 9th, oats on the 16th; a thick haze on the hills at 7 p.m. on 25th; hazy over the sea on the 26th; hazy on 27th; L on 27th at 8.45; shooting stars on 27th; on Saturday, the 28th, the temp. was 80°·4 at 9 a.m., and on 29th, 59°, a difference of 21°·4 in 24 hours.

## SCOTLAND.

DUMFRIES.—There were refreshing showers the first half of the month, but the latter half was very droughty; streams very low, and water scarce; the rainfall more than 3·00 below the average of previous five years; the max. temp. 2°·65 higher than in August, 1868, but the min. 5°·47 less, and the mean of day and night 2°·82 lower. Harvest nearly concluded by the end of the month; wheat excellent, oats and barley rather light; potatoes blackened by frost on 30th and 31st, and turnips suffering from mildew.

HAWICK.—The rains at the beginning of the month saved the turnip crop from destruction, and although they look as if they were in want of R, no fears are now entertained of their safety. Traces of slight frost were seen in the flower border on the morning of the 7th; keen frost on the 29th and 30th, which blackened the potatoe tops, dahlias, and other tender flowers. The month has been very dry and warm, and everything is now suffering from lack of moisture.

AUCHENDRANE.—The drought continues very severe; no remembrance of the springs, locks, and rivers in this district having been so low for so long a time; many of the mills almost entirely stopped, and many of the towns usually well supplied by their existing water works are now nearly without water, such as Greenock, &c., where the mean rainfall is usually very large. Fine weather for harvesting; great heat from 22nd to 28th, and very cold during the night and early morning of 30th, when the exposed ther. on grass fell to 24°.

CASTLE TOWARD.—A month of fine harvest weather; grain crops about all cut, and are now being secured in good condition. Springs are again very low, but grass quite fresh. The low temp. at night and great heat during the day for a week past is causing mildew on roses, peaches, late peas and sweedish turnips.

DEANSTON.—Exceedingly dry month, very bright and warm; T on 1st; severe frost, 25°·7 during the night of 29th; potatoe leaves cut down to the ground, and many flowering plants ruined for the season; great want of water felt in the neighbourhood.

LOGIERAIT.—The light rainfall of the month was almost wholly confined to its commencement. With a deficient rainfall since February, the ground is in a very dry condition, and the crops light, but fine harvest weather; keen frost on the night of the 26th, which completely blackened the potatoe crops.

BALLATER.—The first half of the month rather wet; from the 14th to the end only 0·10 in. fell; grass much burnt up, and turnips suffering from want of moisture. A very violent gale during the night of the 10th; highest temp. of the season on 25th; a sharp frost on morning of the 30th, potatoe stems blighted.

ABERDEEN.—A fine harvest month, but too dry for the grass and green crops, both of which are suffering; the temp. would have been below the average, but for the remarkable heat from the 20th to the 28th, but particularly 24th to 28th; sudden fall of temp. on the 28th, a fall of 27° between noon and 9 p.m.; 25th hottest day (but one) during 13 years.

PORTREE.—This month has been a very dry August for this part of the country; although dark, dull, and generally very foggy, which has been the means of spreading the potatoe disease with great rapidity, the harvest has just commenced, and the crops are extremely heavy. A fine lunar rainbow at 8.30 p.m. on 24th, visible for an hour.

LOCHBROOM.—Cold and dry; a doleful month for the angler, but splendid for the deer stalker. Gale from N. on 10th.

SANDWICK.—August has been drier than the mean; the temp. has been 2°·15 below the mean, owing to the prevalence of northerly winds during the first 12 and last four days, but the crops have made much progress, and harvest operations are beginning. Aurora on 8th.

IRELAND.

KILLALOE.—The smallest rainfall in 24 years in August; max. on 27th 85°, on 28th 86°, and on 29th 56°.

DOO CASTLE.—An exceedingly dry month; a burning sun and total absence of R from 14th to the end of the month, coupled with the drought of the two preceding months, have left their marks upon the face of the country; pasture land burnt up, corn crop in a majority of cases only a half crop, potatoes small and turnips poor; a sharp frost on two succeeding nights, 30th and 31st, has seriously affected the potatoe stalks, and stripped off the luxuriant appearance they generally maintained till then. Springs are dried up, but despite all this sad detail the hay crop is heavier than last year, and is saved without a drop of R, and in excellent condition.

OWENDOON.—Bar. high throughout the month, and the great heat has brought in the harvest rapidly; the temp. fell 31° on the 29th, *i.e.* the maximum.

LECKPATRICK.—Very fine month; all the R fell in the first fortnight, with the exception of three-tenths [*sic*, but three-hundredths as shown by the daily entries, 00·3 in. is doubtless correct. ED.] Sharp frosts on morning of 30th, 27° on the grass. Potatoes, where not damaged by the blight which made its appearance in the middle of the month, have been prostrated by the frost. Less R than in any month this year, nearly as much, 1·65 in., fell in one day in August, 1868.

## SOLAR RADIATION.

*To the Editor of the Meteorological Magazine.*

SIR,—You will perhaps expect a few words from me about the two plans of fixing thermometers *in vacuo*. I speak with diffidence, as I have not tried fig. 2 stand, but I am told by one observer that there is some fear of the thermometer mounted on it being shaken by the wind. Fig. 1 stand is quite secure against this, nor could the wind push it out, though it might not be amiss to put on the stem a couple of thick india-rubber rings, such as those now used with umbrellas, one by each of the wooden collars. This would prevent the instrument being pushed out by accident, and also prevent the globular part being pushed too close to the collar.

With regard to the readings of the instruments, I do not think there can be any difference between the two stands. While, therefore, I am disposed to think fig. 1 more convenient, I am confident that the returns will in either case be equally trustworthy. I may safely leave observers to see that their instruments are not shaken by the wind. Yours, &c., F. W. STOW.

*Ripon, September 2nd.*